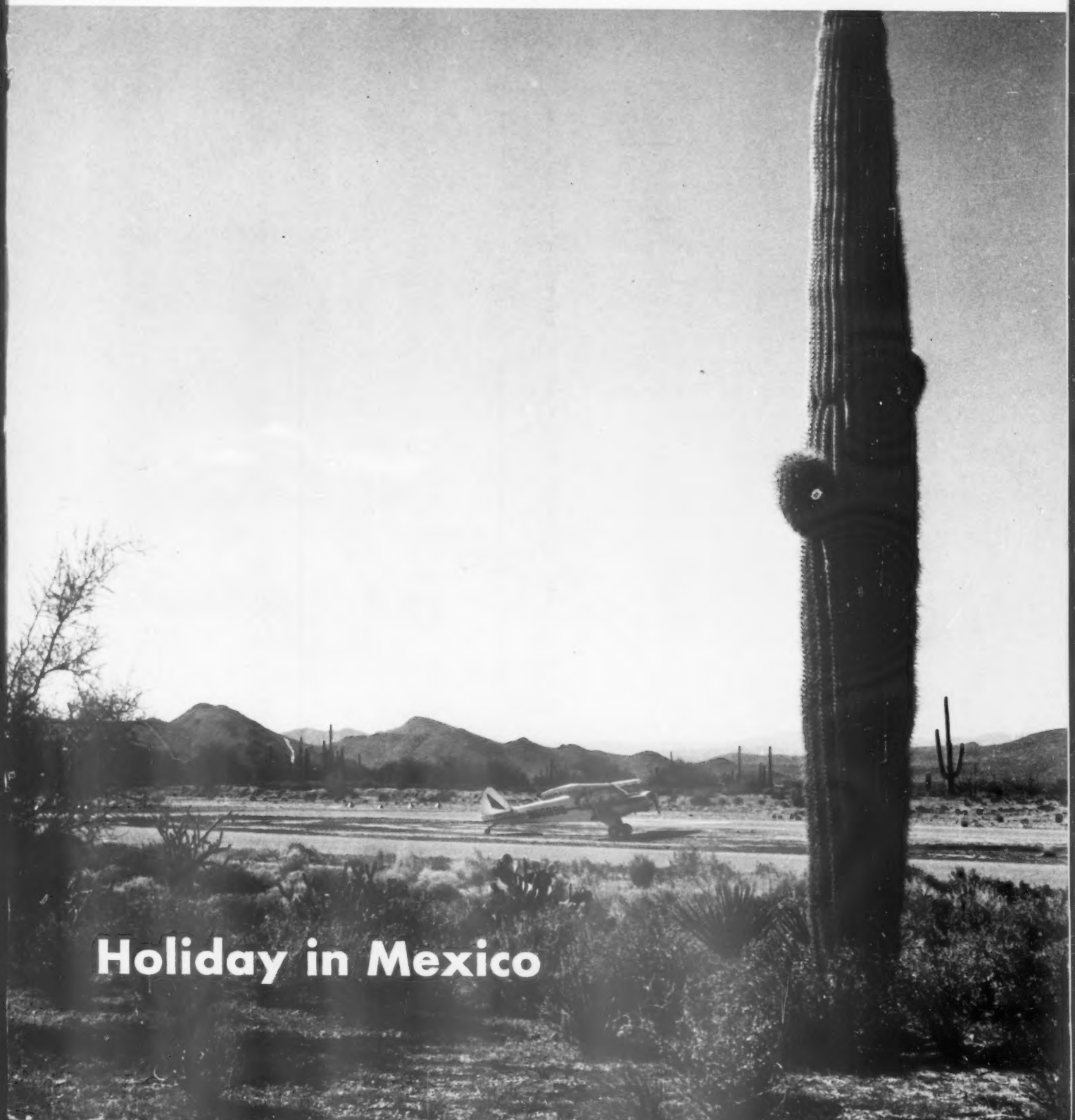
FAA GENERAL AVIATION NEWS

APRIL 1976

A FLIGHT STANDARDS SAFETY PUBLICATION FOR AIRMEN



Holiday in Mexico

COVER:

The land below the Rio Grande

FAA GENERAL AVIATION NEWS

DEPARTMENT OF TRANSPORTATION/FEDERAL AVIATION ADMINISTRATION VOL. 14, NO. 12

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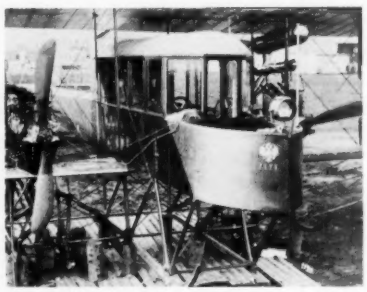

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FAA GENERAL AVIATION NEWS is published by the Office of Flight Standards Service, Federal Aviation Administration, Department of Transportation, Washington, D.C. 20591, in the interest of flight safety. The magazine is designed to promote safety in the air by calling the attention of general aviation airmen to current technical, regulatory and procedural matters affecting the safe operation of aircraft. The use of funds for printing FAA GENERAL AVIATION NEWS was approved by the Director of the Office of Management and Budget on July 30, 1974. All printed materials contained herein are advisory or informational in nature and should not be construed as having regulatory effect. The FAA does not officially endorse any goods, services, materials or products of manufacturers that may be mentioned.

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FAA GENERAL AVIATION NEWS is sold on subscription at $6.20 per year (individual copies, 55 cents) by the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Use the self-mailer order form in the centerfold of this magazine to subscribe. Prices are subject to change without prior notice.

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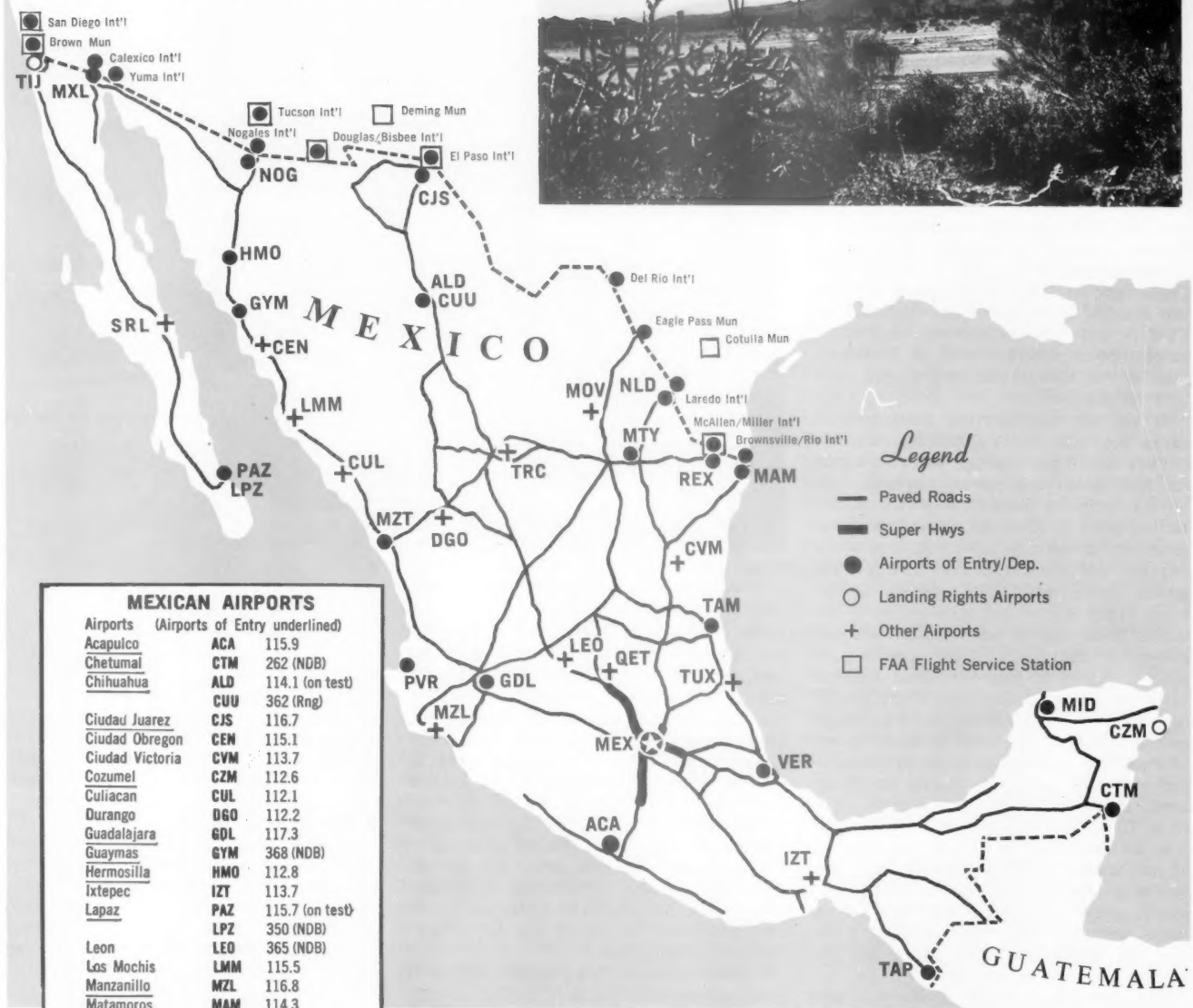
Flying South of the Border



MEXICAN AIRPORTS

Airports (Airports of Entry underlined)		
Acapulco	ACA	115.9
Chetumal	CTM	262 (NDB)
Chihuahua	ALD	114.1 (on test)
	CUU	362 (Rng)
Ciudad Juarez	CJS	116.7
Ciudad Obregon	CEN	115.1
Ciudad Victoria	CVM	113.7
Cozumel	CZM	112.6
Culiacan	CUL	112.1
Durango	DGO	112.2
Guadalajara	GDL	117.3
Guaymas	GYM	368 (NDB)
Hermosilla	HMO	112.8
Ixtepec	IZT	113.7
Lapaz	PAZ	115.7 (on test)
	LPZ	350 (NDB)
Leon	LEO	365 (NDB)
Los Mochis	LMM	115.5
Manzanillo	MZL	116.8
Matamoros	MAM	114.3
Mazatlan	MZT	114.9
Merida	MID	117.7
Mexicali	MXL	115.0
Mexico City	MEX	117.0
Monclova	MOV	333 (NDB)
Monterrey	MTY	114.7
Nogales	NOG	265 (NDB)
Nuevo Laredo	NLD	112.6
Piedras Negras		
Puerto Vallarta	PVR	112.6
Queretaro	QET	115.7
Reynosa	REX	112.4
Santa Rosalia	SRL	112.6
Tampico	TAM	117.5
Tapachula	TAP	115.3
Tijuana	TIP	113.8
Torreon	TRC	116.4
Tuxpan	TUX	262 (NDB)
Vera Cruz	VER	112.9

Everyone interested in flying to Mexico has heard some nightmarish stories about general aviation pilots getting bogged down in regulations once they cross the Rio Grande, or having their aircraft stripped or stolen south of the border. One of the latest of such embroidered tales tells of a plane that went down in some wooded hills in Sonora and was chopped up with chain saws into small pieces by spare parts banditos while the owner was arranging to have it hauled out. The only truth to the story was the use of chain saws, which were needed to cut a path to the downed airplane—which was then dismantled in the normal way before being trucked to a repair station.

Exaggeration aside, it is quite easy to get into trouble flying into Mexico if you do not take the trouble to learn their requirements, and conform. Mexico is a friendly neighbor, but it is also a sovereign state, with its own way of doing business and its own special problems—which include the widespread use of small aircraft for illegal drug and other contraband traffic. Mexico

also happens to have an extremely rugged terrain with great stretches of elevated plateau land, high mountain ranges and sparsely populated countryside—with a much sparser radio navigation system than pilots are used to in the United States. There are about two dozen functioning VOR transmitters located at major cities, but reception may be severely limited by the mountainous terrain and absence of remote installations like those located in the United States. For the rest you will have to rely on low frequency ranges, commercial broadcast stations, and plain and simple pilotage.

For your own protection, as well as a deterrent to aerial banditry, Mexican regulations *require* (not merely recommend) that you maintain radio contact with ground facilities wherever this is possible (frequently it is not). Search and rescue is not as well organized as it is in the United States, and it takes much longer to find lost aircraft, or provide medical assistance. That is why you are advised to leave a point-to-point itinerary with a friend or relative this side of the border, and stick to it religiously.

If you are not carrying passengers or cargo for hire, or transporting non-U.S. citizens out of the country, you can depart for Mexico in your private airplane from any airport in the United States without contacting any U.S. Customs Authorities. Most pilots find it useful to leave from one of the airports near the border that have a flight service station, which can brief you on the latest requirements and forward your required flight plan to your nearest Mexican Airport of Entry. The flight plan will include a notice of your estimated time of arrival to Mexican Customs. There are 28 such airports of entry in Mexico (see map), and your first landing must be made at one of them. It is a good idea to get the formalities over with promptly. If you are flying south from San Diego, for example, drop in at Tijuana to clear customs, even though you are bound to Hermosillo or La Paz. If you headed straight to one of these, and had to go down beforehand for some emergency, you would immediately become an illegal entrant. Your airplane would probably be confiscated and you might be arrested.

You could face similar problems if you landed in Mexico without allowing time (at least one hour) for your flight plan and Customs notification to precede you. To avoid possible delays always obtain an official copy of your flight plan to and within Mexico. If you overfly the airport of entry nearest your border crossing, you must contact the tower in flight.

At the Airport of Entry you will be asked to produce the following documents:

- Proof of citizenship (passport or birth-certificate).
- Aircraft registration if owner; if not, you also need a "use permit," such as a rental or loan agreement, or a notorized letter from the owner stating that you are authorized to use the aircraft *in Mexico for a given period.*
- Liability insurance policy written by a Mexican insurance company which generally offers this service at international airports.
- All documents required in the United States to be in the aircraft or on your person. These must be valid and current or your journey may be terminated on the spot.

The Customs Commandante will provide you with an aircraft Customs form and immigration will issue you a Mexican Tourist Card, both of which are to be surrendered on departure.

General aviation flying within Mexico is governed by rules basically similar to U.S. Federal Aviation Regulations (Part 91) with a few exceptions, notably:

1. A written flight plan is required for all flights, VFR or IFR. (If you cannot file on departure, you must file a notice of completion as soon as possible after landing.)
2. IFR flight plans are required for all night flights—and a qualified co-pilot is recommended (a good safety practice, considering the terrain and the available NAVAIDS).
3. Altitude separation. From 2,000 feet above the ground upwards, all VFR flights, including those within control zones, areas or airways, are to be made at altitudes appropriate to the magnetic course being flown (from 360° to 179°, odd altitudes plus 500 feet; from 180° to 359°, even altitudes plus 500 feet.).

If you have never fueled by hand, learn how it is done properly. Filtering and grounding are essential, and should be carried out or personally overseen by the pilot.

Pilots flying in Mexico for the first time are urged to fly only by day, and in good weather. Weather services are less extensive than in the United States, and much of the terrain is extremely rugged.

RAMSA cards are no longer in use, and there are no longer any fees charged for navigation, communications or weather services for aircraft under 10,000 kilos (22,400 lbs.). There are also no landing fees for such aircraft and they are allowed free tie-down privileges for eight days.

Current charts are important, and should be brought with you. Mexico is covered by three WAC charts: CH-22 (Baja California and Sonora), CH-23 (northern Mexico) and CJ-24 (southern Mexico). They are sold for $1.85 each by the Distribution Division, C-44, National Ocean Survey, Riverdale, Md. 20840. Allow two weeks for delivery. Remember that WAC charts cover twice the area of sectionals (one inch on a WAC covers 16 miles). Radio NAVAID data for Mexico is contained in the low altitude DOD "FLIP" charts (L-1 and L-2), also available from NOS.

Yankee pilots in Mexico are advised to

Above—at some small airports, the "runway" may be shared with other assorted travelers. *Below*—malfunctioning engines from U.S. aircraft (not shown here) had to be removed and shipped back to the States for repair. Have your engine in top condition before you start.

land only at paved airports wherever possible. Off-airport strips or dirt fields may require a familiarity with the terrain which, if acquired at the cost of a damaged airplane, can be *very* costly. You do not want to be involved in any kind of accident in Mexico. Even very slight damage can cause you a heap of trouble, and irritating delays. Note well:

You are forbidden by Mexican law to repair the damage yourself, whether or not you are a qualified mechanic.

You are forbidden by the FARs to allow any Mexican mechanic to work on your airplane unless he is supervised by the holder of an FAA-issued airframe or powerplant certificate—and such holders are exceedingly few in Mexico.

It may be necessary to locate and import a qualified mechanic from the United States to supervise the local mechanic. Replacement parts also probably would have to be shipped from the U.S., and they could be delayed for weeks in Customs, as contraband has been shipped in this manner. The Mexican insurance carrier must be contacted, as well as the U.S. firm that writes your aircraft insurance. The potential delays following an accident are so extensive that you may be tempted to fly the airplane home as is—which could be a serious mistake from the point of view of safety, as well as legality. You can stay out of trouble by simply refusing to take chances while flying abroad.

You also want to avoid being careless enough to lose the airplane, or any of its vital parts. Customs authorities believe that much of the drugs smuggled across the border are carried in stolen aircraft. Never leave it unlocked or in an unguarded area. Even if a stolen aircraft is recovered promptly in Mexico, which is not often the case, it will then be impounded by police and released only upon formal request from the American Embassy in Mexico City. The pilot who loses an aircraft in Mexico is advised to contact the International Aviation Theft Bureau located near Washington, D.C. The telephone is (301) 654-0500; TWX is 710-824-0095; TELEX is 89-8468. The Bureau will assist you in assembling the necessary papers and translations which must be forwarded to the Embassy before it can act.

Aviation fuel is plentiful in Mexico, but often in the country it is stored in aboveground tanks or 55 gallon drums where moisture condensation and rust accumulation are considerable. Chamois cloth is commonly used for straining the fuel. However, you should know that passing fuel through a chamois increases the static electricity hazard. Oil companies recommend using a fine Teflon mesh contained in a metal (grounded) funnel. Teflon is a poor conductor of electricity, but generates very little *static* electricity. A few ounces of prevention could save you many hours or days of lost vacation time.

When the time comes to head back for the United States, make sure you have your Tourist Card in hand as well as your Customs Form, plus a list of all articles carried in the aircraft, and a separate list showing the complete contents of each piece of baggage. You must also have on board each passenger or crewmember who entered the country with you; if one of your people wishes to take the bus or commercial flight home, this decision must be approved *in advance* by Customs on your arrival.

Your departure from Mexico and Customs and Immigration clearance must be made at one of Mexico's 28 Airports of Entry/Departure. No subsequent landing en route to the United States is permitted, except for an emergency—which will take some explaining. You must file a flight plan for your return trip across the border, and you must land first at one of the 13 United States Airports of Entry (see map). Contact U.S. Customs at the airport at least 15 minutes before crossing the border either directly or via an FSS (arrival notice may be included in the flight plan with the abbreviation: ADCUS) and report to a Customs official promptly after landing. Customs services in the United States are free 24 hours a day, except for Sundays and holidays. Arrangements for landing at an airport other than an Airport of Entry must be made with Customs officials at least 30 days beforehand, for regular use, or 15 days in advance for a single flight.

CHECKLIST

Before entering Mexico you must have with you:

Personal Documents

Proof of citizenship
Pilot's certificate
Medical certificate (valid)
Personal radio license

Aircraft Documents

Aircraft registration
"Use permit"
Airworthiness certificate
Flight manual, or flight restrictions
Radio station license
Mexican insurance coverage

Miscellaneous Recommended Items

Charts and publications
Supplemental oxygen
Tiedown equipment
Survival kit
Fuel strainer
Weight and balance sheet
Patience, good humor

Reference Data for Mexico Flights

Rugged, semitropical Mexican seacoast offers little in the way of emergency landing sites.

Spare Parts and Equipment

Many pilots who fly to Mexico like to bring along replacement plugs, and several cans of engine oil, in case approved items are not available when needed. Also advisable are tiedown ropes, as many airports provide only the rings, and some only bare ground. Some pilots bring along a heavy hammer and stakes for tying down; others use gunny sacks, which can be filled with sand or rocks, and used for wheel chocks or tiedown weights.

First Aid

A freshly stocked standard first-aid kit should be carried. Make certain you have a good supply of water purification tablets, and use them whenever you have not been assured that the water is fit to drink. Many pilots like to keep a gallon jug of water in the aircraft for convenience or emergency.

Time Zones

In Mexico, Central Standard time is used the year around, except that Mountain Standard time is used in Sonora and in Baja California from Santa Rosalia southward, and Pacific Standard time is used in northern Baja California.

American Embassy, Consulates

Telephone for the American Embassy in Mexico City, open 24 hours a day, is 905-525-9100. American Consulates are located at Chihuahua, Ciudad Juarez, Guadalajara, Hermosillo, Matamoros, Mazatlan, Merida, Mexicali, Monterry, Neuvo Laredo, San Luis Pososi, Tijuana and Veracruz.

Weather in Mexico

Aviation weather reports are made according to the same code as that used in the United States, with regular reports on the half hour and special reports whenever a significant change in the weather takes place. Reporting stations are fewer then in the United States, and not all airports have weather reports. Get your weather briefing on the ground, if necessary by telephoning the weather bureau; it is difficult to obtain weather information in flight.

Summer is the rainy season in Mexico, with most of the major storms developing in the afternoon, so it is a safe practice to plan flights that can be completed by midday. This also applies to flying below 12,000 feet in the dry season, especially over the desert plateaus, when severe turbulence is frequently encountered in the afternoon. Density altitude can be a serious problem in the hot season; in the tropical south, daily temperatures *average* in the 80s, and a number of airports are located at elevations over a mile above sea level. A Denalt computer is a very handy gadget to have, especially for operating out of small airports, or over mountain passes.

Mexico City

The city is located in a large basin, at an elevation of 7,340 feet, surrounded by mountains that range from about 10,000 feet to over 17,000 feet (Popocatepetl, still a smoking volcano, reaches up to 17,887 feet). Low ceilings are often present here during the rainy season and smog may be trapped in the basin in the early morning. Plan your approach with care.

Customs/Immigration

A military aircraft, even though modified or "demilitarized" for civilian use, may not leave the U.S. without a "License of Temporary Export." Obtain an application form (Form DSP-73) from Munitions Control, Department of State, Washington, D.C. 20520, and send it to the U.S. Customs Office at your intended Airport of Departure at least 10 days before you intend to leave.

If any of your crew or passengers is not an American citizen, clearance from U.S. Customs and Immigration must be obtained before leaving the country.

If you have a minor on board, traveling without both parents, a notarized letter of consent from the absent parent or parents may be required by Mexican Immigration.

Publications

"International Flight Information Manual." Produced by FAA annually, with quarterly updates, the Manual is sold as a subscription item by the Superintendent of Documents, GPO, Washington, D.C. 20402. Price is $8.75 per year, $10.75 foreign mailing. Contents include a directory of foreign and U.S. airports of entry, operational data and regulations, also passport, visa and health requirements.

"World Aeronautical Charts (WAC), $1.85 each.

"Caribbean Low Altitude Enroute" (FLIP) charts. Sold only as a combined packet, including L-1, L-2, L-3, L-5 and L-6. Price, $2.55.

Also for instrument pilots there is the booklet, "Approach Charts for the Caribbean and South America," $1.95.

Charts should be ordered from Distribution Division, C-44, National Oceans Survey, Riverdale, Md. 20840.

An extremely useful booklet for the pilot flying to Mexico is published (annually with updates) by the Aircraft Owners and Pilots Association. Supplied without charge to members, the booklet is also sold to others for $5.00. Write to Flight Dept., AOPA, Box 5800, Washington, D.C. 20014.

Communications

Most of the air traffic controllers in Mexico can communicate in English, but you may have to speak with care to be understood at all times. Control towers generally use 118.1, 118.2 or 118.5. *Note:* VOR transmitters in some localities may be turned off during periods of low activity.

When you are unable to contact ground facilities, use the frequencies 122.8 or 122.9 to talk to other aircraft. Very useful for picking up current weather problems, fuel availability at local airports, etc. Also used for search and rescue.

Conversion Tables

Kilograms	Pounds	Meters	Feet
0.454	1	30	100
0.907	2	60	200
1.361	3	90	300
1.814	4	120	400
2.268	5	150	500
2.722	6	180	600
3.175	7	210	700
3.629	8	240	800
4.082	9	270	900
4.536	10	300	1000

Statute Miles	Meters	Nautical Miles	Kilometers
¼	402	.2	.4
½	805	.4	.8
¾	1207	.7	1.2
1	1609	.9	1.6
1¼	2012	1.1	2.0
1½	2414	1.3	2.4
1¾	2816	1.5	2.8
2	3219	1.7	3.2
2¼	3621	2.0	3.6
2½	4023	2.2	4.0
2¾	4426	2.4	4.4
3	4828	2.6	4.8

Millibars	Inches of Mercury	Millibars	Inches of Mercury
940	27.79	1000	29.56
950	28.08	1010	29.85
960	28.35	1020	30.12
970	28.64	1030	30.42
980	28.94	1040	30.71
990	29.23	1050	31.01

Visual Illusions IV

(Editor's Note: Final article in a four-part series on visual illusions that may contribute to landing and approach accidents, based on a paper by Douglas E. Busby, M.D., of FAA's Civil Aeromedical Institute.)

Relative motion is one of the clues all pilots use, more or less consciously, in judging height above ground. A barn we customarily pass over on a given approach not only has a familiar size, but it also appears to be moving at a familiar speed, relative to the movement of the aircraft. This phenomenon can produce a visual illusion resulting in a faulty approach, when the groundspeed of the aircraft is altered without the knowledge of the pilot. Consider the following example:

A Cessna *Skylane* was making a nonprecision (no glidescope) approach to Montgomery County Airport (Md.) on a morning when visibility was limited by light rainfall. Five miles out of the airport, at an altitude of 2,200 feet and descending, the pilot began to catch glimpses of the rural Maryland farmland below. Airspeed was reduced to 105 mph and the aircraft was lined up visually with Runway 14. At this point the pilot began to have the impression that objects on the ground—trees, grazing cattle, a silo, etc.—were moving by *rather slowly*, in comparison with his usual experience with this type of approach at this airport. The only explanation that occurred to him was that he must be higher than normal on the slide path—*had he been mistaken about the altimeter setting given him by Baltimore Approach Control?*

By steepening his descent slightly he was able to bring about a more familiar relative motion of the objects on the ground. But as he entered the last half mile of his approach he discovered that he was considerably below the normal approach for this runway, and it was necessary to apply power to reach the threshold. He made a fairly hard landing, which apparently did no damage except to the pilot's ego.

Discussing the flight later with other pilots at the uncontrolled airport he learned that a wind shear condition (abrupt change in wind direction and speed) was prevalent in the area with headwinds gusting up to 30 knots over portions of the final approach to Runway 14. Consequently his groundspeed would have been cut by as much as one-third under normal, resulting in a perceptibly slower relative motion of the objects on the ground. That explained the visual illusion which influenced him to sharpen his descent.

Pilots should be alert to the fact that a slow movement of visual cues along the approach path does not necessarily indicate that the glide path is too high. This illusion is produced quite frequently by a strong headwind component, influencing the pilot to fly a lower than normal approach—which could lead to difficulties with the landing.

It should also be remembered that a rapid *increase* in perceived motion occurs when the pilot unexpectedly encounters a strong tailwind during his approach—as in the case of a wind shear. This can produce the illusion of losing altitude more rapidly than desirable. Consequently the pilot may continue the approach with an excessively nose-high attitude, and with the possibility of overshooting the runway, or even stalling.

This type of illusion can be handled safely by bearing in mind that the apparent motion of objects on the ground as seen from the cockpit is relative to the velocity of the wind as well as the airspeed—and the altitude—of the plane. ■

Airline captain Bob Buck and his *Skyhawk*

The Captain Speaking

...about smooth flights and slick pilots

Editor's note: the author of this article recently retired as TWA's Senior Captain after logging over 30,000 hours in everything from sailplanes to 747 jetliners without scratching a single airplane. Following is an excerpt from his recent book, "Flying Know-How," in which he talks about the flying characteristics he admires in any pilot, whether he is flying a Cub *or a jumbo jet.*

There isn't any outward image that signifies a good pilot, and no truth to the old picture of a tall, handsome, blue-eyed Adonis being the best pilot. The color of eyes or skin doesn't mean a thing. When I was a new copilot on one of my first trips, it was rather disturbing to see a corpulent old guy, a little bleary-eyed, puffing and obviously out of shape, struggle into the seat of a DC-2, let out the safety belt to get it around his middle, shorten the rudder pedals to fit his stubby legs, and then fly the airplane with the beauty of a ballet dancer and the wisdom of Solomon.

Appearance doesn't make the pilot, it's what's in his head that does: what he knows and how he uses it . . . and the many, many tricks of the trade he's picked up through the years. One of these tricks is how to fly smoothly.

A smooth pilot is a good pilot, but not just because it feels very comfortable to fly with him, or that he's much easier on the equipment. The important point is that in being smooth he does a better job of flying.

If a pilot is jerky, he tends to overcontrol, which leads to further jerks as he tries to recover from the overcontol. Flying a sensitive airplane that may have dutch-roll characteristics will not be easy for the ham-handed pilot. A delicate instrument approach will be more difficult for the rough pilot.

Most flying is a matter of changing attitude, making small changes, and then stopping them exactly where one wants. It is easy to fall into the habit of watching, say, a change in attitude on the horizon, artificial or real, and then, when the desired attitude is reached, jamming the control the other way to stop the airplane from moving any farther. If we're climbing, such a fast stop will bring a brief feeling of weighlessness to passengers; a pullup will sit them down in the seat with some G's. It is difficult to hit the exact attitude wanted by a quick jab of the controls. Over- and under-shoots occur, making for not only a rough feel, but a poor job of precision flying. During a tight ILS this can lead to localizer and glide slope wanderings, and sometimes a missed approach.

With smooth anticipation, as we approach the attitude desired we begin to stop the climb or descent smoothly with some lead. This can be done in little amounts and big amounts. It takes practice and good scanning.

Being *too* smooth—that is, moving too slowly to correct—can cause overshoots too, but this is prevented by good scanning so that an attitude never gets far out of line before it's stopped and corrected. If excursions of attitude are kept small, then corrections are small and the entire flight path is smooth and accurate.

Keeping It Small

I was flying in the *Concorde* simulator with Gilbert Defer, one of the *Concorde's* test pilots. I wanted him to demonstrate an ILS using hand throttle to keep the proper airspeed. That's difficult in a delta-wing airplane. To ease pilot workload, almost all the *Concorde* landings are made with automatic throttle. You simply dial the approach speed wanted—say 160 knots—and the computerized auto-throttle gives you exactly that all the way down the slot. What I wanted to see, and later try out myself, was how difficult it would be if the autothrottle failed. So we were making ILS's with autothrottle off.

I asked Defer to do one before I tried. The approach speed we used was 161 knots —and the airspeed never left 161! He flew it beautifully. But the interesting thing was that you hardly saw him move the controls; his motions were almost unnoticeable. He wasn't using shoves and pulls; he was simply applying pressure when he needed it. His scan was so good that he would catch an excursion as soon as it started; then he would apply just a little pressure in the direction needed to correct it. And mind you, he was doing the localizer and the rest of the ILS too.

"It is a matter of small pressures and then releasing them before anything gets big."

He meant before the airplane wanders off in big amounts. He was super smooth, as all good pilots are.

Stop It Before It Starts

A spiral dive is the classic way most airplanes are torn up, with control lost on instruments by inexperienced pilots. Well, how does a spiral dive go? The wing drops and the airplane begins to turn. Then the nose drops slightly, and the turning flight becomes descending. If the wing drop were stopped by small aileron pressure when it started, the spiral dive never would get going. But if the turn continues and the nose gets down, the speed builds, and a bigger correction is needed to stop the thing. Now, in the low-experience pilot's mind that increasing airspeed becomes the paramount thing; he may panic to stop that increasing airspeed at all costs. If he pulls back he's doomed: That tightens the spiral dive, as anyone knows.

The experienced pilot gets the turn stopped and wings toward level as he stops the dive. Of course, he does it together, and almost in one action. If he's in a big hairy dive, with airspeed up to red line, he had better be smooth! If he isn't, he'll haul the wings off. It's better to be smooth and

Professional changes of heading and altitude are almost imperceptible. One veteran instructor tells his students to practice until they can make corrections so smoothly that no one else will be aware of the change unless he happens to be looking at the panel.

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gradually pull out, even getting a little more speed in the process, than to jerk back and try to stop the dive. That jerk will create big G's, which we don't want and the wings cannot stand.

The real point is that, with a thorough-scanning-pilot who moves in smooth, small *pressures*, the wing will not get down very far at all, and the spiral dive never will start—which is one difference between a good instrument pilot and a poor one, or one who cannot fly instruments at all. But, either type, it pays to be smooth.

Smooth All Over

Smoothness begins with starting the engines. You see engines started with a great roar and then a quick jerk of the throttle to get them down to reasonable idling speed. That's hard on them. How much nicer to see a quick but smooth power reduction.

A big surge of power is unnecessary and undesirable in starting the engine. Next time you start, note how far the throttle is cracked before using the starter, then see how many RPM's turn up when the engine roars to life. It takes only a little practice to learn to crank up with a minimum of power. (Most engines will start at lower speeds as readily as at higher speeds.)

The use of brakes in taxiing is appalling to watch at times: jerky action, the nose bobbing up and down, and sudden stops until you wonder how the structure takes it.

Using brakes smoothly is a matter of anticipation—thinking ahead to determine the path of the airplane and when brakes will be needed—and then smooth application. Brakes as it's been said by experts, are really an emergency device.

Another area of misconception is that brakes are part of the landing-distance requirement of the airplane. Certainly the airplane is certified for field lengths using brakes, but the awful sight of someone touching down halfway up the field and then smoking the brakes to get her stopped is shocking indeed. At the average airport brakes need only the smallest, most tender application to get the airplane stopped and turned off. Our local airport at Warren-Sugarbush, Vermont is 2500 feet, with a turnoff about halfway down. The average general-aviation single, flown by a good pilot, touches near the runway's beginning (there aren't any obstructions) and turns off in the middle without using much, and often no brakes at all. I've even landed a Cessna *Citation* there, and turned off in the middle with only moderate braking. Yet by poor flying I've seen Cessna 172s pass that turnoff still in the air, finally land, and then pour on brakes to get stopped within the field. Ye gads, what are people thinking! Someday those brakes, beat up from misuse, will fail and that 172 will go off the end, down the hillside, and into a rocky ditch!

Big or Small

Big airplanes aren't any different. I had an engine fail because of oil loss on a 747. I'd taken off from Los Angeles and was headed for London, so we were heavy. About over Bryce Canyon the engine packed up, and we shut it down and headed back to LAX. At 630,000 pounds, we were well over the legal gross landing weight (which for that 747 was 564,000 pounds), but the charts all said that we could land safely within the airport. Well, we try to save fuel, and it was a nice day, and we were okay by the charts, so we decided to land as we were and not dump 11,600 gallons of kerosene in the Pacific Ocean.

So we landed, no problem, but at that weight she really wanted to roll, and this was the time brakes were used. Trying to get rid of that mass of energy really required brakes, and, though applied as tenderly as possible, they got hot, right up into the red on the brake-temperature gauge which 747s conveniently have. We stopped without any blown tires, but now we had about two miles of taxiing to get back to the terminal with the hot brakes. So we very carefully and slowly taxied back, and made the entire two miles without once using brakes—no special trick, just a lot of advance planning. We didn't go fast, and I often wonder if the fast-taxiing guy really has to hurry that much. It's hard on brakes, and invites other accidents.

A Trick To Remember

Have you ever watched people park airplanes? Frequently, just as the airplane stops, it sort of lurches a bit. It's done in automobiles, too, by heavy-footed drivers.

I learned the trick of preventing that many, many years ago when I was flying copilot with a wonderful captain, Alexis Klotz. The first time out with him, he gave me one of the legs to fly. I got her up and down without much trouble, taxied to the gate, and stopped with that little lurch.

"God," Lex exclaimed, "don't you know how to stop an airplane?" Then he went on to explain that you come up slowly to the spot where you want to stop, apply brake gently, and, just as the vehicle stops—whether airplane, automobile, or whatever—you let your foot pressure off the brakes, and there isn't any lurch at all, just a sweet, smooth stop. "Watch the motorman on a trolley car," Lex said. "He swings that big lever over to stop, and just as the car is almost stopped he backs the lever off and the decelerating car stops smooth as silk." Having ridden trolleys much in my youth, it was an instant picture. Of course, there aren't many trolleys left to demonstrate with, but the idea is simple.

It's interesting how a pilot of 1938 passed part of his character and ability on to others. In the next thirty-six years of airline flying I carried the same idea to many new copilots and taught them how to stop smoothly a la Lex Klotz. I wonder how many generations of airline pilots will stop airliners smoothly because of Lex?

I also remember a smooth-flying chief pilot of the early forties, Ray Wells, who gave copilots their final check ride to become captains. After the ride was over and the copilot now a happy new captain, Ray would give him a parting talk, which would end on a note about smoothness. His remarks were simple: "Remember, you are now the highest-paid pilot in the world—for Gawd's sake, fly like it!"

(Reprinted with permission from "Flying Know-How," by Robert N. Buck, published by Delacorte Press, Eleanor Friede. One Dag Hammarskjold Plaza, New York 10017)

Famous
Flights

The Flying Tramcar

First four-engine aircraft rose from the Russian steppes in 1913

Four 100 hp engines lifted this five-ton pre-World War I flying pleasure carriage, *Le Grand*, into the air successfully. Right—Igor Sikorsky, pioneering genius of large-scale aircraft.

They called the airplane a Jules Verne fantasy, a wild dream of a design which could never possibly get off the ground. And there might have been some justification for that literary comparison, because the 23-year old designer and pilot of that airplane had been a devoted reader of Jules Verne in his boyhood.

The date was May 13, 1913. The place: Komendantski Airfield on the outskirts of St. Petersburg in Czarist Russia.

The airplane which was causing all the excitement was a "monstrous" 9,000 pound biplane with four engines. No one had ever designed a successful four engine airplane to that date in history, just ten years after the Wright brothers initial flight; the technical problems appeared staggering. And it seemed to many doubting Russians that the mammoth airplane sitting on the runway that May evening (with 16 wheels of assorted sizes for landing gear) was simply too big to fly. The 60′ long biplane with the 92′ wingspan had an enclosed cabin for pilot and copilot (an aeronautical "first"), and behind them a doorway leading to a luxurious passenger section with four seats, a couch, a table, and room for eight people to walk around comfortably. There was also a washroom and a clothes closet. To top it off, there was another doorway in front of the cockpit leading forward to an open observation balcony with space enough for two passengers to stand during flight.

Critics of the airplane, nicknamed *Le Grand*, admitted that it was indeed grand, the last word in aviation luxury, but they also said it was too heavy to get off the ground; and even if it did somehow become airborne it would be impossible to maneuver in the sky.

If there was one person at Komendantski Airfield that day who had no doubt about *Le Grand's* ability to fly, it was the slender youth at the controls whose name was to become a legendary part of aviation history.

Igor Ivanovich Sikorsky was born in 1889 at Kiev in the Ukraine, the son of a well-to-do physician. He exhibited a mechanical flair as a boy, and set up a chemistry laboratory in the basement of his home. He delighted in the Jules Verne stories of fantastic airships, and his reading led him to Leonardo Da Vinci's notes on creating an airship by some type of whirling device which would lift it vertically up in the sky, and this became a dominant passion of his life.

Igor began his training with a year at an engineering school in Paris, in 1905, and another at the Polytechnic Institute of Kiev. But a summer vacation in Germany in 1908 when he was 19 proved to be the turning point in his life. During that year Wilbur Wright was touring Europe and there were some extended interviews with him in the German press. Igor read these detailed accounts about powered flight avidly, and decided he would make aviation his career.

Returning home, he set up a workshop in a small summer house behind his home, and he began to tinker with designs and model airplanes. He was still influenced by Da Vinci's concept, and he felt that the future of aviation lay in the development of rotorblade aircraft. Later that year he spent four months in Paris, then the aviation center of the world, and for the first time saw an airplane in flight. He visited every accessible aviation workshop, learning all there was to know about aeronautical design and manufacturing. When he sought advice about building a helicopter he was advised that was impossible.

Undaunted, he returned to Kiev with a 23 hp Anzani engine, and proceeded on the construction of a helicopter. The result was a square wooden frame with the engine attached to one side and a pilot's seat on the other. In the center was a transmission box with a shaft reaching up to a wooden rotary blade. Mechanically it functioned well, but he could not get it to lift off the ground. Recognizing the obstacles, he put the idea away in the back of his mind where it would lie dormant for 30 years.

During 1910 in the summer house he started construction of what he called the S-1, the first of what were to become more than 50 designs in the famous "S" series over the years. The S-1 was a light biplane with the pilot's seat on the lower wing. But, like the helicopter, the S-1 also proved a failure. He tested it in a pasture outside Kiev, and although he could drive it around the pasture he could not get it airborne.

He went back to the drawing board again, and designed the S-2, basically the same airplane, but he put the engine on the leading edge of the wing ahead of the pilot with a tractor propeller instead of the pusher propeller he had used on the first model. He also added rudders on the tail section.

On June 3, 1910, when he was 21-years old, he got the S-2 airborne for a 12 second flight of 200 yards at an altitude of 2 to 4 feet. It was not much, but it was the first time Sikorsky had ever flown an airplane, and now he knew he could design one that would fly.

However, a few flights later the S-2 stalled at an altitude of 80 feet, and Igor crash landed in a field. The airplane was demolished, but he was unhurt. S-3 followed, then

S-4, and S-5—each flew longer and better than its predecessor, but all wound up in a heap—as a result of an engine failure. A multi-engine craft seemed the answer, but money was becoming a crucial problem. Igor was being supported by his family, whose surplus capital had all but been consumed by his five wrecked aircraft. How could he expect more? However, his father had confidence in the young designer, and he did the traditional thing in old world families: he mortgaged the family jewels.

In 1911 Sikorsky constructed another single engine airplane, the S-6, with a 100 hp engine and seats for three. Carrying two passengers, he flew it at speeds of 70 mph —a new world record for an aircraft with three on board.

This distinction gave young Igor a chance to finally put his career on a paying basis.

In 1912 the society of Russian Baltic Railroads wanted to open an aircraft division in St. Petersburg. The 23 year old Sikorsky was offered the position as designer and chief engineer. The Society also bought all his earlier designs, and commissioned him to design one new airplane a year. He moved to St. Petersburg in the spring and began to work in the small aviation factory with a staff of 30 workers. His first design for the Society was a military airplane, the S-6-B.

In September of that year he had dinner with the chairman of the Society, Michael Shidlowsky, and explained his dream of the multi-engine aircraft, a closed-cabin, four-engine model for use in the cold Russian winters. It would be larger than any existing aircraft, capable of carrying eight to ten passengers and traveling 300 to 500 miles in flight. To his surprise, Shidlowsky told him to go ahead and build it.

Crowning achievement of Sikorsky was the *Skycrane*, (below), which has revolutionized industrial transportation and construction.

All that winter his crew worked long hours in the factory at St. Petersburg. In April the major parts had been completed and were taken out to Komendantski Airfield to be assembled. The airplane was originally named *Bolshoi Baltisski* (Great Baltic), but the awed workers spoke of it as the *Big One*, or *Le Grand*, and that is the name that stuck.

When *Le Grand* was being assembled, Sikorsky's critics began to vocalize their derision. They said it was too big and heavy to fly or control in the air. Furthermore, they warned that if one outboard motor were to fail, the airplane would be unsteerable. And some argued that it could not be piloted from an enclosed cabin because the pilot needed the feel of the air stream to fly his airplane evenly.

Sikorsky bowed to these fears only the extent of mounting the four water-cooled 100 hp Argus engines, one behind the other, so that he had both pusher and tractor propellers. He made the fuselage long to provide plenty of leverage for steering, and he had *four* big rudders on the tail. The wings were long and narrow, in contrast to the shorter and wider wings then common on less hefty aircraft. They could not find wheels big enough for *Le Grand* so they designed a landing gear with 16 airplane wheels. And when they could not find steel wire light and strong enough for anticipated stresses, they used piano wire.

By early May *Le Grand* was completed, and the 13th was selected for the initial flight. Igor himself was the test pilot. A few weeks shy of his 24th birthday, he sat alone in the cockpit, while a co-pilot sat back in the passenger section, and a mechanic rode outside on the balcony. He ran the engine to full throttle, and then signalled the wing holders to release, as the *Le Grand* rolled over the grassy field. It seemed to gain speed slowly, but soon the tail rose and the airplane picked up speed. Sikorsky eased the control wheel back and the 9,000 pound airplane rose into the air and climbed out steadily.

He got the airplane up to 60 mph, keeping a careful eye on *Le Grand's* few instruments: tachometers for the engines, two altimeters, plus a few home-made instruments; a U-glass tube with alcohol connected to a sort of pressure receiver to indicate the flying speed, a ball in a curved glass tube to work as a bank and turn indicator, and a long metal tube mounted outside the cabin windshield to show the angle of incidence.

According to his plan, he leveled off at 400 feet and started a 60 degree turn to the left. At 600 feet he did a similar turn, bringing it back over the hangars. The mechanic standing in front of him turned around and waved him on. The flight was going smoothly.

To contradict his critics, he pulled back on the throttle and reduced the power to simulate an engine failure in one engine. *Le Grand* held its course, with moderate opposite rudder. Coming back toward the field, he reduced power on all four engines, descended in a gentle glide and crossed the boundary of the field at 50 feet. *Le Grand* landed smoothly in the center of the field.

The flight had lasted a little less than ten minutes, but it was a landmark flight in aviation history.

Sikorsky was mobbed by well-wishers on the ground, besieged by the press, and later honored by Czar Nicholas II. But despite all the acclaim Sikorsky was not completely satisfied with the performance of his airplane. He felt that the takeoff and climb were too slow and he corrected the problem by boldly placing the engines four abreast on the wing.

In August of that year he took the modified giant aloft with seven passengers on board, flew for an hour and 54 minutes and reached a record-shattering altitude of almost 3,000 feet.

Sikorsky followed this triumph with an even bigger aircraft, the *Ilya Mouromets*, the "Tramcar on Wings," with a gross weight of 10,500 lbs and a wingspan of 113 feet. This "Pride of the Russian Skies" carried 16 passengers and included a lighted dining room, toilet and central heating.

Russian trail-blazing in air transportation was halted by World War I, when the Sikorsky giants were converted to military bombers and terrorized the Eastern Front, dropping 30 ton loads of explosives from safe altitudes. Squadrons of German fighters had to be diverted from the West, until the Russian aerial behemoths were grounded for lack of the faithful Argus (German built) engines.

Sikorsky fled Russia in 1917 when the Czarist regime was toppled, and eventually he arrived in New York, penniless and unknown—except to his fellow emigres. Such was their faith in the creator of the legendary *Le Grand* that centuries old family silver was melted down to provide backing for his return to the laboratory and the production hangar. Their support was rewarded eventually with the sight of Sikorsky-designed globe-circling *Flying Clippers* that gave the United States an unshakable lead in the aviation industry.

Successful once again, Igor Sikorsky dusted off a 30-year old dream and devoted the remainder of his career to designing successful helicopters. By the time of his death, in 1972, Sikorsky's *Skycranes* were capable of lifting nearly 10 tons—straight up. But then he started out thinking big. ■

The Engine Doctor

A new series designed to clear up various mysteries and misconceptions concerning the Beast up front.

TIME BETWEEN OVERHAUL

Q-1. *My airplane has an engine with a recommended time between overhaul of 1,800 hours. I am nearing that point. However, the engine is running fine. Must I replace it or have it overhauled at that time?*

A. The recommended time between overhaul (TBO) is not mandatory for private non-commercial airplane operators (those operating under FAR Part 91). TBO is the manufacturer's estimate of the average trouble-free lifespan of a given engine that has been operated and serviced as recommended. The determination of when to overhaul or exchange your engine should be made on the basis of its operating condition. That means that if your engine is running well—regardless of hours of operation—you can continue to use it until an inspection reveals that it is beginning to deteriorate. Whenever this occurs—even if only a small fraction of the normal TBO period has gone by—repairs should be made, not only in the interest of safety but also because it may prevent the eventual destruction of some very expensive parts. As you approach the recommended overhaul point you should pay closer attention to the engine's condition. It is more common for an engine to need overhauling *before* the recommended TBO than after. Engine manufacturers attribute this to poor flying and lack of maintenance.

Q-2. *I've heard of people losing an engine without any warning. I don't want that to happen to me over a lake or a mountain. Since I'm a pilot, and not a mechanic, would it be best for me to go by the book on TBO's? Or are there any obvious telltale signs of trouble on the way?*

A. There are some clearly defined symptoms that any alert pilot can observe. The most obvious is increasing oil consumption. If you keep track of the oil used you are not likely to be taken by surprise. The aircraft that starts burning a lot of oil is like a person with a fever. Something is wrong somewhere.

Q-3. *How much oil is too much?*

A. It varies with different engines and kinds of operation. A limit on the permissible oil consumption for each particular engine is established by the manufacturer.

Understand, high oil consumption does not always mean your engine needs an overhaul—you may just have a leaky oil line. If so there should be plenty of evidence on the outside of the engine.

The quantity of oil being used may not be as significant as the pattern of consumption. A gradual slight increase may be reasonably normal for your engine. An abrupt increase is sure to be a sign of trouble. Don't try to guess how much you are using—keep a log on it and compare with the manufacturer's limitations.

Q-4. *If I find there is a serious oil loss, do I have to wait until the engine is torn down before I get some idea of what it will cost to rebuild it?*

A. There are several diagnostic procedures which will give you a pretty fair idea of what has gone wrong inside the engine. Some of these the pilot can perform himself. For example, by examining your sparkplugs regularly for evidence of oil deposits (moist, sooty coating of electrodes) you can learn whether you are actually burning oil (blowing oil past the piston rings), and you can get some idea of whether oil is interfering with proper ignition. The oil screen is also an important indicator. If it is loaded up with metal particles, you know metal is banging against metal somewhere.

During break-in of new or rebuilt engines, it is normal for the screen to contain some minute particles as the rings are shaping the cylinders. After break-in, metal particles in the oil are normally so fine that most are not trapped by the oil filter. As the need for an overhaul approaches, the metal particle content of the oil will increase perceptibly.

Q-5. *Isn't there some way they can actually look inside the engine to see what is wrong? Something called a* boroscope?

A. Yes, to some degree. A boroscope is a flexible tube with a light and a magnification mirror on the end. The mechanic inserts it into the cylinder through a sparkplug hole or other access hole and looks for signs of damage.

Q-6. *What can you learn from a compression checks?*

A. A differential compression check will tell us how much loss of air pressure takes place during the normal functioning of the cylinder. A given amount of air pressure, usually 80 PSI (lbs. per sq. inch) is forced continuously into the cylinder through the sparkplug hole, and a gauge measures the pressure that is retained. This shows if there is an air loss through the rings, valves, etc. A separate reading is made for each cylinder. A five PSI loss, for example, is written as 75/80, or −5. Most manufacturers consider a loss of more than 25 percent (20 PSI) unacceptable. (Caution: If compression test is attempted—piston must be at top dead center, compression stroke, and prop firmly held.)

Q-7. *Some owners I know have their oil analyzed regularly by an outfit called SOAP. They send a specimen from the sump and get back a bill of health. Is this reliable?*

A. SOAP stands for "spectrometric oil analysis." It is a procedure carried out by various laboratories throughout the country, generally reliable and useful to a point in learning about the health of your engine. Contents of the oil sample sent by the owner are identified qualitatively and quantitatively by a spectrometer, which separates their reflected light according to spectrum. The content of steel, aluminum, iron, brass and other material is indicated. The report sent back to you by the lab will tell you whether the engine appears to be in satisfactory condition, or whether abnormal amounts of foreign matter (mostly metals) are present. You may also be advised to have certain maintenance services or inspections performed.

Q-8. *What other "foreign matter" gets into my engine?*

A. Carbon, for example, is a product of incomplete combustion, commonly asso-

Keeping a written record of your engine's oil consumption is like keeping a finger on its pulse signalling problems under the cowl before things get out of hand. IMPORTANT: Be sure all oil-handling equipment is clean.

ciated with excessive idling at low rpms (high cylinder head temperatures). *Gum* in the crankcase is usually a direct result of raw fuel washing the cylinder walls and getting into the oil; it could be caused by overly rich fuel mixtures, or from bad rings. *Tar* is created by oil decomposition, following excessive engine temperatures. *Dirt* may be drawn into the engine when the aircraft is operated on the ground with carburetor heat open.

Q-9. *What are the bad habits of flying that "age" an engine?*

A. The engine manufacturers say that the time between overhauls will be shortened if pilots frequently climb at steep angles, make abrupt throttle changes, improperly lean

Sparkplugs that need cleaning because of oil fouling are a sure indication of ring wear. Postponing an overhaul could lead to scored cylinder walls and expensive repairs.

the engine in climb; exceed red-lined manifold pressure and/or RPM, chop throttles abruptly and let down rapidly, causing rapid contraction (by cooling) of metals that have been heated up to operating temperatures.

In other words, a sick engine usually means a careless or ignorant pilot. No question about it, engines age eventually, as we all do even with the best of care, but the way that you handle the aircraft has a lot to do with keeping it running young.

On the maintenance side, engine life is shortened if factory recommended inspection procedures and intervals are not followed.

Q-10. *That seems to bring us back to square one. Would you say the moral of this lesson is, "Oil's well that ends well?"*

A. I wish you hadn't said that. ■

BRIEFS

HOW TO KEEP YOUR BEARINGS (clean). A minute amount of dirt can cause a mountain of trouble in a bearing. Disassembled bearings must be kept surgically clean. Used bearings should be treated as carefully as new ones, never handled with wet or dirty tools or hands, or wiped with anything but a clean, lint-free rag. If it is necessary to lay bearing components down, do so only on clean paper; wrap in oilproof paper when not in use. Any lubricant used must be of the proper type and perfectly clean (keep in a covered container for protection between use).

A different kind of bearing problem can result when a cleaning solvent being used to wash the aircraft gets into the bearings and removes the lubricants. Bearing seals, which restrain grease and prevent entry of dirt and dust, do not always keep out highly penetrating cleaning solvents. Take care when cleaning your aircraft that the solvent does not get on bearing seals.

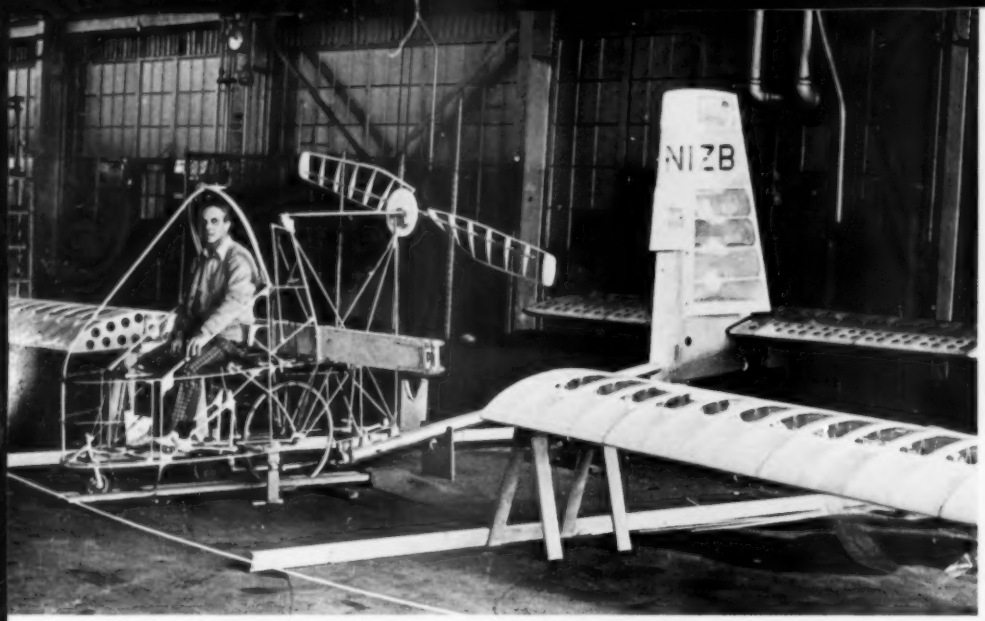
■ ASPIRING AIRCRAFT MECHANICS will be interested in a recently updated directory of FAA Certificated Maintenance Schools. Certification of a school by FAA indicates it meets the requirements of FAR Part 147 for the ratings issued (but does not necessarily mean that it has been approved for educational purposes by other Federal or State agencies). For the listing of schools, which includes addresses and ratings, write for AC 147-2F, "Directory of FAA Certificated Aviation Maintenance Technician Schools". For information about specific schools, write directly to the school.

STUDENT, ATP GUIDES UPDATED. A newly revised 30-page booklet for prospective student pilots or those already in primary flight training is now available. The book answers every question a student might be concerned about prior to solo flight, including the address of the nearest Flight Standards District Office which has jurisdiction over his training. Request FAA's Advisory Circular 61-12G. "Student Pilot Guide," from your nearest Government Bookstore, or from the Superintendent of Documents, GPO, Washington, D.C. 20402. Price is 65 cents.

■ AIR TAXI WEIGHT AND BALANCE CONTROL is the subject of an updated FAA Advisory Circular. Under certain circumstances air taxi operators may be authorized to use a system based on average, assumed or estimated passenger and baggage weights to comply with airworthiness requirements and aircraft operating limitations. The method used must be approved as part of the operations specification. AC 135-1B, "Air Taxi Aircraft Weight and Balance Control," includes information on establishing the aircraft status, loading schedule, computing the load manifest, considerations for developing a system, record keeping, etc.

DIGITAL CLOCKS and their use in aviation (in lieu of the old-style clock with sweep second hand) is the subject of a new FAA Advisory Circular. Included are guidelines for installation of such clocks and also for their operation. Ask for AC 20-94 "Digital Clock Installation in Aircraft".

Unless otherwise noted Advisory Circulars mentioned in this column are available free from DOT/FAA Distribution Unit, TAD 443.1, Washington D. C. 20591.



ONE MANPOWER. Joe Zinno, who used to fly Air Force C-141's with 84,000 horsepower, sits aboard his one man-powered pedal-driven homebuilt aircraft which has been certificated by FAA as "experimental." The craft weighs only 150 pounds consisting mainly of thin aluminum tubing, balsa wood and clear plastic sheeting. A modified bicycle frame with the front wheel removed provides the fuselage and an anchor point for the pedals, which move up and down. There is an 8½ foot variable pitch propeller. Zinno expects to make his first flight this spring at Quonset Point, R.I. If he succeeds in flying a mile over a figure-eight course around two pylons he will win a long unclaimed $100,000 prize offered by a British Industrialist, Henry Kremer.

Photo: David Gustafson, Rhode Island College

Transponders Offer Best "Radar Enhancement"

A careful study of 271 mid-air accidents in general aviation over an eight-year period has indicated that the radar transponder is the best available means of preventing such accidents in a radar environment.

The investigation was instigated following recommendations by the National Transportation Safety Board that radar detection of small aircraft could be improved with the use of low-cost reflectors and other devices to increase the radar return and also eliminate the danger of "tangential effect" (loss of radar return from a small aircraft when flying at a certain angle to the transmitter).

The FAA study covered both "passive" and "active" enhancement devices and concluded that to be effective, passive devices would have to be too large for practical purposes. Active enhancers that amplify the radar signal before sending it back have a number of unresolved technical problems, such as antenna placement and potential interference with ground radars, and would offer no substantial saving over the cost of a transponder (minimum cost $600).

The study report recommends that FAA continue to focus research and development efforts on improving the design of the ground radar equipment to increase its ability to detect small aircraft.

The report, "Radar Enhancement of Small Aircraft in the Air Traffic Control System" (FAA-RD-75-98) can be purchased from the National Technical Information Center, 5285 Port Royal Rd., Springfield, Va. 22151. Price is $4.50.

AIM Part 1 Upgraded, Free Copies Offered To Pilots

FAA will offer every active pilot in the country a free copy of the Airman's Information Manual (AIM), Part I. This quarterly FAA publication is the basic reference guide for pilot training and flight operations in the National Airspace System.

Extensively revised and scheduled for May issuance, the new Part I will contain an expanded glossary of some 600 terms and phrases used in air traffic control by FAA specialists.

Other changes to AIM include the addition of a handy reference index, cross-references to other Parts of AIM as well as to FARs and Advisory Circulars, and an enlarged description of air traffic procedures and pilot and controller responsibilities. Part I is sold by the Government Printing Office for $7.60 per year.

Interested pilots may obtain the May 1976 issue free at any Air Traffic facility or Flight Standards District Office by presenting the letter of invitation they will soon receive from FAA Administrator John L. McLucas. The offer will be extended through December 1976.

More Spin Clinics May Be Held

The introduction of stall/spin clinics for flight instructors last year by FAA's Central Region has generated interest throughout the United States. As a result, other such clinics may be held in other locations depending on local interest and available FAA manpower. Purpose of the clinics is to update the knowledge of the instructor with regard to stalls and spins in the airplanes he flies and to provide him with a voluntary means of regaining proficiency and confidence in stall and spin recovery techniques, which will be passed on to students.

Clinics are to be conducted by FAA with industry participation, particularly that of aircraft manufacturers, and will consist of classroom lectures and discussion as well as flight demonstrations (which are optional for participants).

'Discrete Address' Radar System

As a step toward the evolutionary upgrading of the automated air traffic control system, FAA has contracted for ground and airborne equipment to be used in testing a Discrete Address Beacon System (DABS). The chief advantage of DABS is its capability to interrogate and receive a transponder reply from a specific aircraft rather than from all aircraft in the zone of coverage, as with present radar equipment.

Prices Set for AD Summaries

The new Summary of Airworthiness Directives (AD's) will become available about May 1, 1976. Price for Volume I (small aircraft) is $14.00 (foreign mailing except Canada and Mexico is $3.50 additional). Price for Volume II (large aircraft) is $13.50 (foreign mailing $3.25 extra), which includes biweekly supplements.

Checks made out to Federal Aviation Administration must accompany the order. Address DOT/FAA Aeronautical Center, Attn: AAC-23, P.O. Box 25461, Oklahoma City, OK. 83125. *Do not send orders or money to the U.S. Government Printing Office.*

VFR Flight Plans Will Continue

The proposed policy change that would have eliminated most VFR flight plan service has been withdrawn by FAA after evaluation of numerous public comments, the majority of which opposed the proposal. The proposed change was issued in May 1975 to assist FAA in determining whether a suitable alternative was available to fulfill the main purpose of the VFR flight plan service: the initiation and conduct of search and rescue missions. FAA now believes that there is not a suitable alternative, and the proposal has been withdrawn. The withdrawal does not however, preclude consideration of similar proposals in the future.

• Bugging the Tube

Your article on airspeed indicator errors ("The Impossible Climb," February 1976) was very informative and helpful. My experience with pitot tube blockage was not with ice but with bugs. Our club plane was being used for night training. When I used it the following day for a business trip everything was fine until about 45 minutes into the flight. I then noticed the airspeed indicator showing a drop in speed from cruise speed of 125 mph to 50 mph over a span of about a minute. Fortunately the flight was in excellent VFR conditions and upon subsequent removal and inspection of the pitot tube it was found that several insects had almost completely plugged the tube.

Del Junker
Brainerd, Minn.

• More on Pitot Problems

I enjoy your FAA GENERAL AVIATION NEWS, even though you've jacked the price again this year, but I question your article regarding airspeed indicators. The article theorized that if the pitot was clogged, the airspeed indicator would act as an altimeter and by your diagram I can see how that might happen. However, I once flew into a situation where rain, then snow, was falling. I had no pitot heat, and shortly my airspeed indicator dropped to zero. My assumption was that the pitot had frozen. Upon completing a 180 degree turn and returning to a lower altitude (while on the approach) the airspeed indicator again began functioning. This actual happening contradicts the theory of your article. Can you explain?

Hal Stephen
San Jose, Calif.

Blockage of the pitot system creates different types of errors in airspeed reading, depending on the type of system and on how the blockage occurs. (See the second part of the pitot-system article "Attitude Flying" in the March issue.) Specifically, if ram air only is blocked, the airspeed reading may drop to zero, as in your case. However, if the static port is located elsewhere on the aircraft and if the ram air opening and the pitot drain hole are completely blocked, then pressure is trapped in the system and the airspeed indicator may react as an altimeter, i.e. the airspeed reading increases as altitude increases.

A new FAA Advisory Circular AC 91-43 "Unreliable Airspeed Indicators" discusses the subject and is available free from DOT/FAA Distribution Unit, TAD 443.1, Washington, D.C. 20590.

• Altitude Engine

Part 91.33b(8) refers to an "altitude engine." What is an altitude engine and where can I find a definition?

James M. Thoburn
Rochester, N.Y.

An "altitude engine" is one designed to operate at higher-than-normal altitudes by methods such as supercharging. A suggestion to insert a definition of "altitude engine" and also of a "sea level engine" was made during the First Biennial Airworthiness Review, and was published last May as a "Notice of Proposed Rule Making" (#75-19). Comments on that proposal are presently being evaluated, with a final rule expected within the next few months. The proposal calls for the following definitions to be included in FAR Part 1.1:

"Altitude engine" means a reciprocating aircraft engine having a rated takeoff power that is producible from sea level to an established higher altitude. "Sea level engine" means a reciprocating aircraft engine having a rated takeoff power that is producible only at sea level.

• Where is the VASI?

In reading the article "Visual Illusions III" in the February 1976 issue of FAA GENERAL AVIATION NEWS I find that I'd be in trouble trying to follow the "three-board daylight VASI" into the strip depicted on page 13. Am I getting old and blind, or is it really not there?

Your articles are a must for me, and I would highly recommended them to any active pilot. The most enjoyable for me are the "Famous Flights" series. The dangers of continued flight under VFR into adverse weather conditions cannot be emphasized enough. You have had some excellent articles on this problem but people still insist on becoming statistics by doing it. Education with actual conditions depicted seems to be a partial answer. More power to you—keep up the good work!

James J. Zimmerman
Eugene, Oregon

Sorry—a patch of fog appears to have drifted across the VASI in the production process of the photo you had trouble with. See below for clear-weather photo.

• Poor Man's VASI?

O.K. I give up. What is a three board VASI?"

Confused and curious
New York

The "simple three-board VASI" (visual approach slope indicator) which was barely visible in the February photo, is an inexpensive landing aid in use at a number of medium-to-small general aviation airports, particularly in Maryland. The principle is similar to the light-bar VASIs in common use at busy airports, but the cost is much less.

Formally known as a "bar alignment VASI" or "Collins VASI" (after William O. Collins of the Maryland Department of Transportation who developed it), the three-board VASI consists of three brightly colored panels placed near the approach end of a runway. If an approaching plane is on the right path (usually 3½ to 4 degree slope) the panels will appear to the pilot to be in a straight line, like three dashes in the Morse code. If the approach is low, the center panel appears low; if the approach is high, the center panel appears high. Although used mostly for daylight flying, some of these landing aids are being equipped with fluorescent tubes for night use. The bar alignment VASI is presently undergoing evaluation at the FAA National Aviation Facilities Experimental Center at Atlantic City, N.J.

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFS-807, Washington, D.C. 20591.

• Follow that Sundowner

I fly in southern California which has very high traffic densities. It is not uncommon to enter the traffic pattern and get a sequence request like, "58J, number five, follow the *Sundowner* downwind." Now, how am I supposed to know what a *Sundowner* looks like? There is nothing in the FAA requirements or written exams on airplane identification—in fact the written exam deals with hypothetical aircraft. Maybe it is not that important, but I would feel better if I knew that I was following the airplane I was told to and not cutting someone out.

Dennis Pinion
Canoga Park, Calif.

Amen. *Any time you feel the description given is inadequate for positive identification, do not hesitate to ask for more information. The objective of controllers is to describe the aircraft sufficiently for recognition without congesting the radio, particularly at busy locations. They will furnish further details if you indicate the need ("Please describe the aircraft.").*

• Air Traffic and Metric System

Can you tell me when the Air Traffic System in the United States will go metric?

William C. Feldbaumer
Warrington, Pa.

No dates have been set. Studies are presently underway to FAA to estimate the impact of conversion with regard to safety, cost and human factors.

INSTRUMENT CORNER

• Simulator and X-C Time

Can time acquired in a ground trainer or simulator be accrued towards either an instrument rating's total time requirement (not the 40 hours specifically required for "instrument time") or the ATR total time requirement?

Would you also clarify the term "cross-country time" as it applies to the instrument rating and the ATR?

J. W. Robson
College Park, Md.

Ground trainer time up to a maximum of 20 hours is creditable toward the 200 hours requirement of total pilot flight time for an instrument rating. For an airline transport pilot certificate, up to 25 hours in an approved ground trainer may be credited toward the total pilot flight time required for that certificate. See FAR 61.155(b)(2)(iii).

To qualify as "cross-country" time for an instrument rating or ATR, a flight must involve a landing at a point more than 50 miles from the point of departure. Although not incorporated in any regulation (as it is for private and commercial certificates) this figure was set in an interpretation issued by the FAA Chief Counsel on July 1, 1975.

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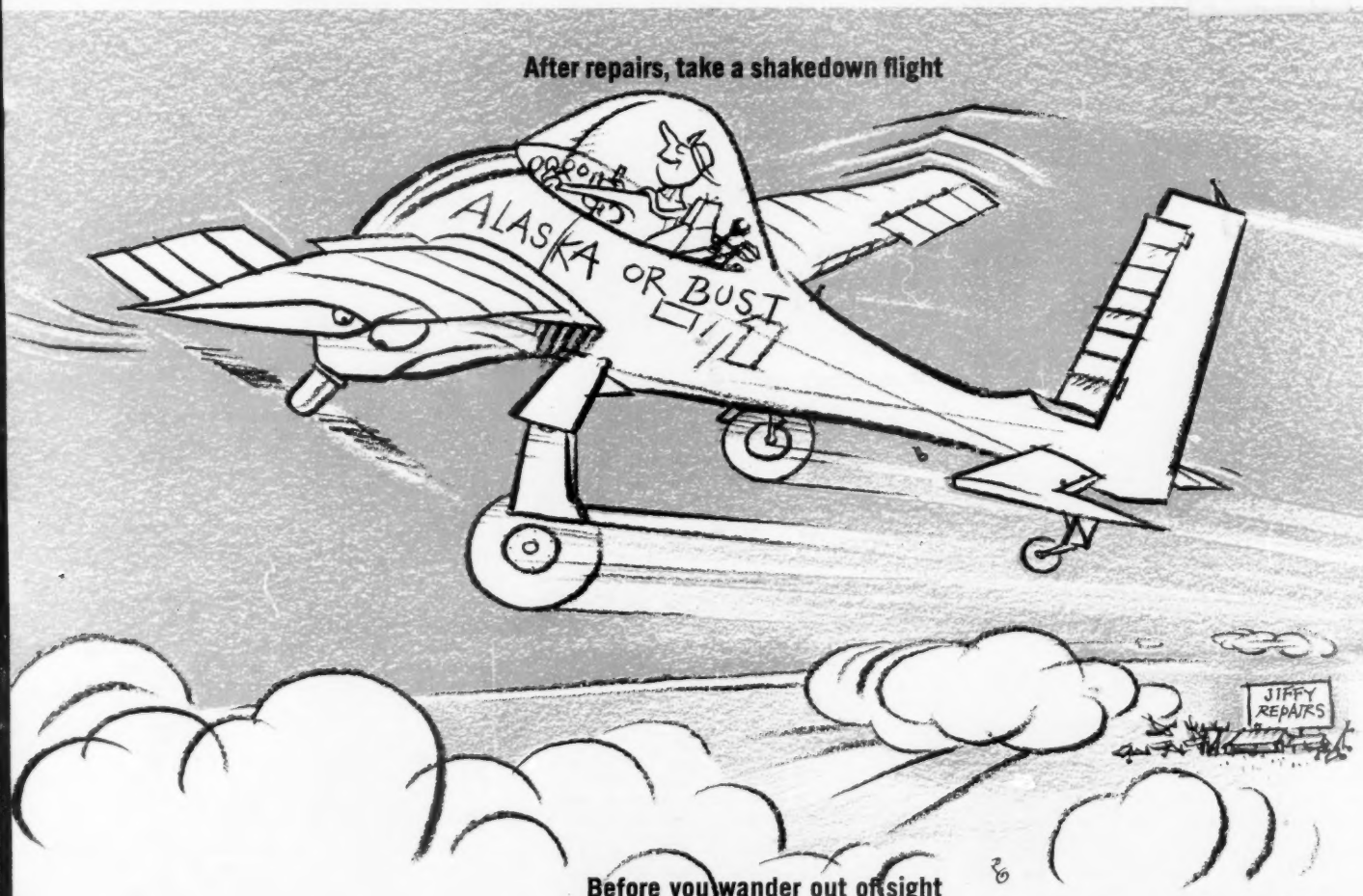

Before you wander out of sight

Idea suggested by Richard Gamble, ATC, Key West, Florida.